A.D. 1860, 26th *June.* N° 1549.

SPECIFICATION

OF

MATTHEW CARTWRIGHT.

MOUTH-PIECES FOR DENTAL AND OTHER PURPOSES.

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A.D. 1860, *26th June.* N° 1549.

Mouth-pieces for Dental and other Purposes.

LETTERS PATENT to Matthew Cartwright, of No. 7, Crescent, in the City of Carlisle, in the County of Cumberland, Dentist, for the Invention of "Improvements in the Manufacture of Mouth-pieces for Dental and other Purposes."

Sealed the 18th December 1860, and dated the 26th June 1860.

PROVISIONAL SPECIFICATION left by the said Matthew Cartwright at the Office of the Commissioners of Patents, with his Petition, on the 26th June 1860.

I, Matthew Cartwright, of No. 7, Crescent, in the City of Carlisle, in the County of Cumberland, Dentist, do hereby declare the nature of the said Invention for "Improvements in the Manufacture of Mouth-pieces for Dental and other Purposes," to be as follows:—

At present mouth-pieces used by dentists for the insertion of artificial teeth are formed of a composition consisting of india-rubber, with other ingredients ordinarily known amongst dentists as vulcanite or the vulcanite base. This substance after being compressed in a mould formed from an impression taken in wax or gutta percha of the inside of the mouth, so as exactly to fit the roof or other part of the mouth, is baked or hardened by heat in the mould. When taken out of the mould the surface being ordinarily dark colored, and more or less rough, is not only unpleasing in appearance, but would be disagreeable in the mouth. Dentists, therefore, usually file or scour off the rough outer surface, and refit it as exactly as possible to the convolutions of the palate or other part of the mouth by cutting or otherwise. After the piece has been so reduced, the fit is necessarily imperfect. Vulcanite has an odour of which it has hitherto been impossible wholly to get rid, notwithstanding the most careful preparation of the material.

My Invention consists in protecting the surface of the vulcanite by a thin coating of gold, platina, or tinfoil, and for that purpose lining the mould, when prepared for the reception of the vulcanite, with gold leaf, gold foil, or crystal gold, platina leaf, or tinfoil, by which the surface of the vulcanite mouth-piece is preserved from injury or discoloration in the process of hardening. By this means an exact fit accurately corresponding to the original wax impression of the mouth is preserved. The metallic surface may be thickened by electro-plating them in the gold, if it be thought desirable. The heat and compression in the process of hardening the vulcanite causes the vulcanite to adhere strongly to the metallic surface, so that the metal forms an external surface, which not only protects the mouth-piece from injury when in use, but prevents the escape of objectionable odours.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Matthew Cartwright in the Great Seal Patent Office on the 24th December 1860.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Matthew Cartwright, of No. 7, The Crescent, Carlisle, Dentist, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-sixth day of June, in the year of our Lord One thousand eight hundred and sixty, in the twenty-fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Matthew Cartwright, Her special licence that I, the said Matthew Cartwright, my executors, administrators, and assigns, or such others as I, the said Matthew Cartwright, my executors, administrators, and assigns, should at any time agree with and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "Improvements in the Manufacture of Mouth-pieces for Dental and other Purposes," upon the condition (amongst others) that I, the said Matthew Cartwright, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Matthew Cartwright, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, that is to say:—

At the present time the mouth-pieces used by dentists for the insertion of artificial teeth and other similar purposes are commonly formed of a composition ordinarily called or known amongst dentists as vulcanite or the vulcanite base, being a kind of hardened india-rubber, or rather a composition formed of india-rubber, with other ingredients. This substance is first moulded to the shape of the mouth, which is usually done by compressing it in a mould formed from an impression taken in wax or gutta percha of the inside of the mouth, so as exactly to fit the roof or other part of the mouth to which the mouth-piece is to be adapted. It is then baked or hardened by heat in the mould. When taken out of the mould the surface of the vulcanite mouth-piece is generally dark colored, and more or less rough; such dark color and roughness being caused by the heat or immediate contact with the mould. It is therefore not only unpleasing in appearance, but would be disagreeable in the mouth. Dentists, therefore, usually file or scour off the rough outer surface, and then polish the piece, refitting it as accurately as possible to the convolutions of the palate or other part of the mouth. The reduction, however, necessarily renders the fit imperfect, and the color and smell of the composition are unpleasant.

The present mode of manufacturing such vulcanite mouth-pieces for artificial teeth, is as follows:—An impression of the inside of the mouth is taken in wax or gutta percha, from that a plaster of Paris cast is taken. In the crescent of the model or cast so made, the artificial teeth are placed in the position which they are intended to occupy in the mouth of the patient, and fixed in that position with wax. A mouth-piece is then formed upon the model with heated wax, and attached to the teeth. The model containing the teeth and wax mouth-piece is then placed in the lower half of a metallic flask, and plaster is poured round it to fix it. It is then allowed to dry. When dry the surface of the plaster contained in the lower half-flask is rubbed over with oil, soap lather, or some liquid which will prevent the plaster in the upper half-flask from adhering to it. The upper half-flask is then placed upon the lower half, and the upper half is then filled up with liquid plaster; the lid of the upper half flask is put on, and the whole is then allowed to stand till dry, which will be in about an hour. When dry the upper and lower half-flasks are separated, but the lid is not taken off. When separated the wax is taken out, leaving the teeth fixed in the plaster; the two half-flasks being still separated, are then placed in a digester or heating apparatus for the purpose of being heated till thoroughly warm. A piece of the composition called vulcanite or vulcanite base is then cut in pieces and softened by heat on a hot plate or otherwise, and the cavity for the mouth-piece well filled or packed therewith. Both half-flasks are then replaced in the digester till the vulcanite is sufficiently softened by the heat, when they are taken out of the digester. The two halves of the flask are then put together and placed in a vice or under a press, so as to compress the vulcanite, and bring the edges of the mould into close contact. They are allowed to remain in the vice or press till they are partially cooled and the vulcanite is set.

Some dentists adopt another mode of filling the cavity of the mould with vulcanite after melting out the wax by heat, through a small hole left in the plaster for that purpose, without separating the parts of the flask. They force the vulcanite, which has been previously softened in a heated cylinder, by means of a screw worked by hand into the mould through the nozzle of a pipe attached to and forming part of the cylinder, which is inserted in a hole in the lid of the flask. The vulcanite being so pressed in by the screw does not require to be compressed by means of the vice or press. In other respects the process is similar to that before described.

The flask when filled by either of the methods aforesaid, is then placed and screwed in a clamp in order to keep it together. The vulcanite is then baked or hardened by placing the whole in a heating apparatus. After being baked for about two hours, it is taken out and allowed to cool. When cool the flask is separated, and the mouth-piece to which the teeth are attached is taken out of it. The surplus of the vulcanite is then cut away, and the rough overplus filed or cut off; the piece is then scoured and polished up for the use of the patient.

My Invention consists in protecting the surface of the vulcanite by a coating of gold, platina, or tin foil, and for that purpose lining the mould when prepared for the reception of the vulcanite with gold leaf, gold foil, or crystal gold, platina leaf, or tin foil, by which the surface of the vulcanite is preserved from injury or discoloration in the process of hardening, or otherwise. By this means an exact fit accurately corresponding to the original wax impression of the mouth is preserved. The compression and heat employed in the process of forming and hardening the mouth-piece cause the vulcanite to adhere strongly to the metal, so that the metal forms an external surface, which protects the mouth-piece from injury when in use. The metallic surface may be thickened by electro-plating if thought desirable.

In obtaining the plaster mould, fixing the teeth, and forming the wax mouth-piece, I proceed in the mode usually adopted and herein-before described. The wax used should be free from Canada balsam, which is found in some wax used for dental purposes. The wax mouth-piece when cool is taken out of the model with the teeth attached thereto, and the model lined with crystal gold, gold leaf, platina, or tin foil, which must be carefully pressed into the crevices, hollows, and irregularities formed by the convolutions of the mouth and other parts of the mould. Should any crack in the gold leaf occur in the course of adaptation, the interstice should be carefully covered with additional gold leaf, crystal gold, platina, or tin foil, by pressing and fitting the same thereto. I prefer what is known as crinkled gold leaf for the side of the mouth-piece next the palate, or which is to rest against the jaw; and for the palate of the mouth-piece, or that part thereof which is to be in contact with the tongue, I prefer gold leaf rough on one side, viz^{t}., that in contact with the vulcanite, and smooth on the other, i.e., that which is to be in contact with the tongue. The wax mouth-piece is then replaced on the model, and the upper side of the wax piece is then covered with crystal gold, gold leaf, platina, or tin foil, by fitting and pressing the same thereto and thereon. A small rod of wax is then formed sufficiently long to reach to a hole in the lid of the flask when stuck on in an upright position on the wax mouth-piece. The wax rod should be about the thickness of a large pencil. A hole exactly the size of the rod should be then cut in the wax mouth-piece through the gold covering with a knife or other sharp instrument, and the rod united to the wax mouth-piece. Two smaller rods, each about the size of a crow quill, are then formed in wax, and in like manner attached to the mouth-piece on each side of the same. The upper half-flask is then put on next. The ends of the two rods are connected with two holes, one on each side of the upper half-flask, called the escape gates. The upper half-flask is then filled up with liquid plaster, and the lid put on, and the whole allowed to stand till the plaster is set. When the plaster is set the whole flask is put into a clamp, and placed in a saucepan of boiling water with the lid of the flask downwards, so that the wax may run out freely, care being taken that the lid of the flask does not touch the bottom of the saucepan. When the wax is boiled out the flask may be taken out of the saucepan and placed in a saucepan containing clean boiling water, with about a half an ounce of washing soda in the water, so as to extract any greasy matter. Boil it for five minutes, and then take out the flask and place it in a digester until it becomes thoroughly heated to boiling heat, so that it may be fit for the reception of the vulcanite. The flask is then to be taken out of the saucepan, removed from that clamp, and screwed in a strong powerful clamp, so that the flask may be firmly held together; the flask should then be placed in a vice, or otherwise firmly fixed, as by a powerful screw opposite to the nozzle of a cylinder, in which the vulcanite is heated, care being taken to place the nozzle well into the hole of the lid. The vulcanite, which may be softened in the cylinder by means of steam, is then driven by means of a piston attached to a screw, worked by the hand through the nozzle of the cylinder into the flask, until the vulcanite comes out of the escape gates. The operator should then pause for a minute, and then again proceed to force, by means of the screw, more vulcanite into the flask, which will be found capable of receiving it without any equivalent quantity exuding from the escape gates. When the flask will not receive any more, the surplus vulcanite should be pinched off at the escape gates, and two small screws made to fit such escape gates screwed in. The operator should again proceed to force in as much more vulcanite by the cylinder or piston screw as the cavity will admit, so that the vulcanite may be firmly compressed into the mould. The flask is then allowed to remain a few minutes to cool, so that the vulcanite may get partially set in the cavity. The flask is then to be removed from the nozzle of the cylinder, and a metal nut or stopper placed to fill up the hole in the lid. The flask is then removed from the clamp and screwed into a bridle clamp, which is brought over the nut or stopper. The vulcanite is then hardened by placing the flask with its contents on an ordinary steam or dry heat vulcanizer, and keeping up the heat at a temperature of three hundred and fifteen degrees for about two hours. After the flask is taken out of the vulcanizer it is allowed to cool, and the clamp may then be removed, and the parts separated in the usual way. The vulcanite ends communicating with the escape gates and hole in the lid must next be cut off even with the surface of the mouth-piece, and at these spots not covered with gold, holes may be drilled, so as to form small cavities, which may be filled with fresh vulcanite, or Jacob's gutta percha; if the former, the mouth-piece must again be placed upon the model and put in the digester, and the vulcanite while in a hot state covered with crystal gold. If the latter be used, it may be melted into the cavity by means of a hot iron, and the surface covered with crystal gold.

Another and more simple mode of covering the mouth-piece with the gold leaf, crystal gold, platina, or tin foil, is as follows:—After having formed the wax mouth-piece and teeth upon the model, the same is placed in the lower half-flask, and fixed therein with liquid plaster. The gold leaf, crystal gold, platina, or tin foil is then nicely adapted upon and over the upper side of the wax mouth-piece, and after soaping or oiling the plaster in the lower half-flask the upper half-flask may be placed upon the lower half, and the flask filled up with plaster, the lid may then be put on, and the whole allowed to stand till the plaster is set. After the plaster is set the parts of the flask should be separated, when the wax mouth-piece and teeth will be found firmly imbedded in the upper half-flask, which may be placed in a saucepan of boiling water to boil out the wax, in the manner before stated. The model, which is now in the lower half-flask, is now to be put into a digester and heated for about half an hour, when it may be taken out, and the gold or other leaf carefully adapted upon it in the manner above described, then take the vulcanite and heat it in the cylinder, as above described. When the vulcanite is sufficiently soft it may be worked out of the nozzle into the hand, and the cavity of the plaster cast in the upper half-flask filled with the vulcanite by the hand, carefully adapting it with the fingers. This should be quickly done while the vulcanite is soft and hot. A sufficient quantity should be put in to leave a slight overplus, when the flask is put into the press. Both half-flasks are then to be put into the digester and well heated to about boiling heat. The two half-flasks may then be taken out, put together, and placed in a screw press, where they may remain for ten minutes, they may then be taken out and put into a clamp, after which the mouth-piece must be baked or hardened by heat of a temperature of three hundred and fifteen degrees, as above described. By this process the edges may not be completely covered by the gold, owing to the surplus vulcanite, which, when pressed, comes out between the two half-flasks. I have found the vulcanite rubbers which are not highly colored the best adapted for the purposes of this Invention.

What I claim as my Invention is, the protecting the surface of the vulcanite by a coating of gold, platina, or tin foil, in the manner and for the purposes described, and the lining the mould when prepared for the reception of the vulcanite with gold leaf, gold foil, or crystal gold, platina leaf, or tin foil, by which the surface of the vulcanite may be preserved from injury or discoloration in the process of hardening, and an exact fit accurately corresponding to the original wax impression of the mouth be preserved.

In witness whereof, I, the said Matthew Cartwright, have hereunto set my hand and seal, the Twenty-second day of December, in the year of our Lord One thousand eight hundred and sixty.

MATTHEW CARTWRIGHT. (L.S.)

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